

Appln. No.: 10/572,867
Amendment Dated April 27, 2011
Reply to Office Action of January 27, 2011

UOD-215US

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appln. No: 10/572,867
Applicant: John F. Rabolt
Filed: March 21, 2006
Title: ACTIVE AND ADAPTIVE PHOTOCHROMIC FIBERS, TEXTILES AND MEMBRANES
T.C./A.U.: 1791
Examiner: Leo B. Tentoni
Confirmation No.: 3642
Docket No.: UOD-215US

AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the Office Action dated January 27, 2011, please amend the above-identified application as follows:

- ☐ **Amendments to the Specification** begin on page _____ of this paper.
- ☒ **Amendments to the Claims** are reflected in the listing of claims which begins on page 2 of this paper.
- ☐ **Amendments to the Drawings** begin on page _____ of this paper and include an attached replacement sheet(s).
- ☐ **Amendments to the Abstract** are on page _____ of this paper. A clean version of the Abstract is on page _____ of this paper.
- ☒ **Remarks/Arguments** begin on page 5 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently Amended) A process to make a dyed fiber which comprises mixing at least one dye capable of reversibly changing color and at least one polymer into at least one solvent at a temperature below the temperature at which the dye or polymer degrades to form a polymer dye solution and electrospinning said polymer dye solution to form a fiber wherein the dye penetrates more than the surface of the fiber and is uniformly dispersed through the fiber, wherein the dye comprises a photochromic compound.
2. (Cancelled)
3. (Cancelled)
4. (Cancelled)
5. (Cancelled)
6. (Original) The process as claimed in claim 1, wherein said polymer is Poly(L-lactide)(PLA), 75/25 Poly(DL-lactide-co-E-caprolactone), 25/75 Poly(DL-lactide-co-E-caprolactone), Poly(E-caprolactone), polyglycolic acid, polydioxanone, collagen, polytetrafluoroethylene, polyurethane, polyester, polypropylene, polyethylene, polybutylene or silicone.
7. (Original) The process as claimed in claim 1, wherein said polymer dye solution contains at least one solvent selected from the group consisting of hexafluoroisopropanol, dichloromethane, dimethylacetamide, chloroform, dimethylformamide, methylene chloride, and xylene.
8. (Original) The process as claimed in claim 1, wherein said polymer is a polyester, polydimethyl isophthalate (DMI), polymethyl methacrylate (PMMA), polyethylene terephthalate (PET), polycarbonate, polystyrene, polyvinylidene chloride, polyvinylidene fluoride,

polyethyleneoxide, nylon 6, nylon 6/6, nylon 11, nylon 12 or mixtures thereof.

9. (Original) The process as claimed in claim 8, wherein said at least one solvent is a high-volatile solvent group or a low-volatile solvent group or a mixture thereof.

10. (Previously Presented) The process as claimed in claim 9, wherein said solvent is acetone, chloroform, ethanol, isopropanol, methanol, toluene, tetrahydrofuran, water, benzene, benzyl alcohol, 1,4-dioxane, propanol, carbon tetrachloride, cyclohexane, cyclohexanone, methylene chloride, phenol, pyridine, trichloroethane, ~~[[or]]~~ acetic acid~~[[;]]~~, N,N-dimethyl formamide (DMF), dimethyl sulfoxide (DMSO), N,N-dimethylacetamide (DMAc), 1 - methyl-2-pyrrolidone (NMP), ethylene carbonate (EC), propylene carbonate (PC), dimethyl carbonate (DMC), acetonitrile (AN), N-methylmorpholine-N-oxide, butylene carbonate (BC), 1,4-butyrolactone (BL), diethyl carbonate (DEC), diethylether (DEE), 1,2-dimethoxyethane (DME), 1,3-dimethyl-2-imidazolidinone (DMI), 1,3-dioxolane (DOL), ethyl methyl carbonate (EMC), methyl formate (MF), 3-methyloxazolidin-2-one (MO), methyl propionate (MP), 2-methyltetrahydrofuran (MeTHF) or sulpholane (SL).

11. (Currently Amended) A process to make a dyed fiber which comprises mixing at least a photochromic dye capable of reversibly changing color and a polymethyl methacrylate polymer into a CHCl_3 solution at a temperature below the temperature at which the photochromic dye or polymethyl methacrylate polymer degrades to form a polymer dye solution and electrospinning said polymer dye solution to form a fiber wherein the dye penetrates more than the surface of the fiber and is uniformly dispersed through the fiber.

12. (Original) The process as claimed in claim 1, wherein the electrospinning is conducted at room temperature.

13. (Previously Presented) The process as claimed in claim 1, wherein there are at least two dyes capable of reversibly changing color being used.

14. (Original) The process as claimed in claim 1, wherein there are at least two polymers being used.

15. (Withdrawn) A fiber made from the process as claimed in claim 1.
16. (Withdrawn) A camouflage material which comprises the fiber as claimed in claim 15.
17. (Withdrawn) A sensor which comprises the fiber as claimed in claim 15.
18. (Withdrawn) A sensing membrane which comprises the fiber as claimed in claim 15.
19. (Withdrawn) A counterfeit protector which comprises the fiber as claimed in claim 15.
20. (Withdrawn) An information storage mechanism which comprises the fiber as claimed in claim 15.
21. (Withdrawn) An optical switch which comprises the fiber as claimed in claim 15.

Remarks/Arguments:

I. Status of the Claims

Claims 1 and 11 are amended herein. Support for the amendment is found throughout the application as originally filed, including in claim 2 (now cancelled). No new matter has been added. Claims 3-5 were previously cancelled. Claims 15-21 are withdrawn from consideration, pursuant to a restriction requirement. Thus, claims 1 and 6-14 are currently pending and under examination.

II. Claim Rejections under 35 U.S.C. § 103

Applicants traverse the rejection of claims 1, 6-10 and 12-14 under 35 U.S.C. § 103(a) as being unpatentable over Foulkes US 2006/0036318 ("the Foulkes reference") in combination with Senecal et al. US 2001/0045547 ("the Senecal reference"). Reconsideration and withdrawal of the rejection are respectfully requested in view of the following remarks.

The Office Action takes the position that the Foulkes reference teaches, in paragraphs [0028] and [0040] in particular, "a process of making a dyed fiber including the steps of mixing a dye capable of reversibly changing color and a polymer...at a temperature below the temperature at which the dye or polymer degrades to form a material composition and electrospinning the material composition to form a dyed fiber wherein the dye penetrates more than the surface of the dyed fiber and is distributed uniformly throughout the dyed fiber, wherein the dye includes a photochromic compound and wherein the dyed fiber is capable of exhibiting a reversible color change when exposed to light." However, certain of the teachings that the Office Action alleges are contained in the Foulkes reference in fact are ***not*** present.

In particular, the Foulkes reference does not teach or suggest:

- a). "mixing a dye capable of reversibly changing color and a polymer";
- b). "mixing...at a temperature below the temperature at which the dye or polymer degrades"; or
- c). "wherein the dye penetrates more than the surface of the dyed fiber and is distributed uniformly throughout the dyed fiber."

The Foulkes reference describes a method and biocompatible insert for modifying eye color. The biocompatible insert may, according to the reference, be "a fabric including opacified material" (Abstract). This embodiment is further described in paragraph [0040], which states

that "[t]he fabric may itself be the web that opacifying material is supported by, or the fabric could be comprised of fibers that are impregnated with the opacifying material." "Supported by" would be interpreted by an ordinarily skilled person as meaning that the opacifying material should be placed on the outside surfaces of the fibers of the fabric (i.e., that the fibers support the opacifying material). "Impregnated with" would be understood by an ordinarily skilled person to mean that already-formed fibers should be somehow treated to impregnate the fibers with the opacifying material. Neither of these possibilities include, or would suggest to an ordinarily skilled person, Applicants' claimed process (as recited in claim 1) wherein a dye which comprises a photochromic compound and which is capable of reversibly changing color is combined with a polymer, with the resulting mixture (further including a solvent) then being subjected to electrospinning to form a fiber.

Therefore, the obviousness rejection is fundamentally flawed since the Office Action does not document the rationale required for such a conclusion of obviousness to be legally proper.

Applicants traverse the rejection of claim 11 under 35 U.S.C. § 103(a) as being unpatentable over the Foulkes reference in combination with the Senecal reference and further in view of Balkus, Jr. et al. US 2003/0168756 ("the Balkus reference"). Reconsideration and withdrawal of the rejection are respectfully requested in view of the following remarks.

The Office Action takes the position that the Foulkes reference teaches, in paragraphs [0028] and [0040] in particular, "a process of making a dyed fiber including the steps of mixing a dye capable of reversibly changing color and a polymer...at a temperature below the temperature at which the dye or polymer degrades to form a material composition and electrospinning the material composition to form a dyed fiber wherein the dye penetrates more than the surface of the dyed fiber and is distributed uniformly throughout the dyed fiber, wherein the dye includes a photochromic compound and wherein the dyed fiber is capable of exhibiting a reversible color change when exposed to light." However, certain of the teachings that the Office Action alleges are contained in the Foulkes reference in fact are **not** present.

In particular, the Foulkes reference does not teach or suggest:

- a). "mixing a dye capable of reversibly changing color and a polymer";
- b). "mixing...at a temperature below the temperature at which the dye or polymer degrades"; or

- c). "wherein the dye penetrates more than the surface of the dyed fiber and is distributed uniformly throughout the dyed fiber."

The Foulkes reference describes a method and biocompatible insert for modifying eye color. The biocompatible insert may, according to the reference, be "a fabric including opacified material" (Abstract). This embodiment is further described in paragraph [0040], which states that "[t]he fabric may itself be the web that opacifying material is supported by, or the fabric could be comprised of fibers that are impregnated with the opacifying material." "Supported by" would be interpreted by an ordinarily skilled person as meaning that the opacifying material should be placed on the outside surfaces of the fibers of the fabric (i.e., that the fibers support the opacifying material). "Impregnated with" would be understood by an ordinarily skilled person to mean that already-formed fibers should be somehow treated to impregnate the fibers with the opacifying material. Neither of these possibilities include, or would suggest to an ordinarily skilled person, Applicants' claimed process (as recited in claim 11) wherein a photochromic dye capable of reversibly changing color is combined with a polymethyl methacrylate polymer, with the resulting mixture (including a solvent) then being subjected to electrospinning to form a fiber.

Therefore, the obviousness rejection is fundamentally flawed since the Office Action does not document the rationale required for such a conclusion of obviousness to be legally proper.

III. Conclusions

Applicants respectfully submit that the application is in condition for allowance and early and favorable action thereon is requested. If any issues should remain, the Examiner is invited to contact Applicants' legal representative at the telephone number shown below.

Respectfully submitted,



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RAD/SDH/jmh

Dated: April 27, 2011

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The Director is hereby authorized to charge or credit Deposit Account No. 18-0350 for any additional fees, or any underpayment or credit for overpayment in connection herewith.